

Key for European species of the *Cheilosia proxima* group (Diptera, Syrphidae) with a description of a new species

Ante Vujić^{1,†}, Snežana Radenković^{1,‡}, Sonja Trifunov^{1,§}, Tijana Nikolić^{1,||}

¹ Department of Biology and Ecology, Faculty of Sciences, University of Novi Sad, Trg Dositeja Obradovića 2, 21000 Novi Sad, Serbia

[†] [urn:lsid:zoobank.org:author:A20D5863-CF18-4BF7-BB68-0DA75D34B7A8](https://zoobank.org/A20D5863-CF18-4BF7-BB68-0DA75D34B7A8)

[‡] [urn:lsid:zoobank.org:author:26DF35D9-55FA-4485-8E8C-C1F90EFE1036](https://zoobank.org/26DF35D9-55FA-4485-8E8C-C1F90EFE1036)

[§] [urn:lsid:zoobank.org:author:CE460EFE-9641-4D43-A7E5-6518148DE33C](https://zoobank.org/CE460EFE-9641-4D43-A7E5-6518148DE33C)

^{||} [urn:lsid:zoobank.org:author:FCD7852F-F745-4365-B1D4-9B051DE4D7D1](https://zoobank.org/FCD7852F-F745-4365-B1D4-9B051DE4D7D1)

Corresponding author: Ante Vujić (ante.vujic@dbe.uns.ac.rs)

Academic editor: X Mengual | Received 2 January 2013 | Accepted 23 January 2013 | Published 15 February 2013

[urn:lsid:zoobank.org:pub:1EAF6D59-27E5-4192-8267-8FE0E38C3FBD](https://zoobank.org/pub/1EAF6D59-27E5-4192-8267-8FE0E38C3FBD)

Citation: Vujić A, Radenković S, Trifunov S, Nikolić T (2013) Key for European species of the *Cheilosia proxima* group (Diptera, Syrphidae) with a description of a new species. ZooKeys 269: 33–50. doi: 10.3897/zookeys.269.4619

Abstract

A new hoverfly species, *Cheilosia barbafacies* Vujić & Radenković **sp. n.** (Diptera, Syrphidae), is described and distinguished from the closely related species *C. pascuorum* Becker, 1894, based on material collected from the mountains of the Balkan Peninsula. Diagnostic characteristics and an identification key for the members of the *proxima* group of *Cheilosia* s. str., including the new taxon, are provided.

Keywords

Diptera, Syrphidae, *Cheilosia barbafacies*, *proxima* group, new species

Introduction

Cheilosia Meigen, 1822 is the largest Palaearctic hoverfly (Diptera, Syrphidae) genus with nearly 300 species listed by Peck (1988), and 439 described species worldwide (Thompson et al. 2010). Its distribution extends to the Nearctic (more than 80 species), Oriental (about 50 species) and northern part of the Neotropical regions (one species from Chiapas, Mexico, and another one from Guatemala) (Ståhls et al. 2004; Thompson et al. 2010).

This genus belongs to the monophyletic tribe Rhingiini of the subfamily Eristalinae, as a sister group of Eumerini (Ståhls et al. 2003). According to Peck (1988), the tribe Rhingiini (as Cheilosini) includes the genera *Chamaesyrphus* Mik, 1895, *Cheilosia*, *Endoiasimyia* Bigot, 1882, *Ferdinandea* Rondani, 1844, *Ischyroptera* Pokorny, 1887, *Macropelecocera* Stackelberg, 1952, *Pelecocera* Meigen, 1822, *Portevinia* Goffe, 1944, *Psarocheilosia* Stackelberg, 1952 and *Rhingia* Scopoli, 1763. The phylogenetic relationships of the tribe Rhingiini and the genus *Cheilosia* (Diptera, Syrphidae) were investigated by Ståhls et al. (2004) using morphological and molecular characters. The monophyly of subtribes of Rhingiini remained ambiguous, especially because of unstable phylogenetic placements of the genera *Portevinia* and *Rhingia*, while most of subgenera of *Cheilosia* appeared as monophyletic clades.

The subgeneric classification of *Cheilosia* has been changed from Becker's (1894) division of the genus into four artificial groups (A–D) to Barkalov's (2002) description of 13 subgenera, of which 9 are new (*Cheilosia* Meigen, 1822; *Endoiasimyia* Bigot, 1882 (= *Sonanomyia* Shiraki, 1930); *Taeniocheilosia* Oldenberg, 1916 (= *Nigrocheilosia* Shatalkin, 1975); *Hiatomyia* Shannon, 1922; *Neocheilosia* Barkalov, 1983; *Eucartosyrphus* Barkalov, 2002; *Floccocheila* Barkalov, 2002; *Pollinocheila* Barkalov, 2002; *Montanocheila* Barkalov, 2002; *Nephocheila* Barkalov, 2002; *Conicheila* Barkalov, 2002; *Convocheila* Barkalov, 2002; *Rubrocheila*, Barkalov 2002). Several of these subgenera were recognized earlier as species groups (*nigripes*, *longula*, *illustrata*, *alpina*, *velutina*, *scanica*, *sachtlebeni*, *formosana*) (Barkalov 1983). Before Barkalov's subgeneric division (2002), the names of subgenera *Nigrocheilosia* Shatalkin, 1975, *Neocheilosia* Barkalov, 1983 and *Cheilosia* s. str. were also in use. The *nigripes* species group corresponds to subgenus *Nigrocheilosia*, the *scanica* species group to subgenus *Neocheilosia*, and most members of the *velutina* group to *Cheilosia* s. str. The monophyly of the genus *Cheilosia*, as well as subgenera (*Nigrocheilosia*, *Neocheilosia*, *Cheilosia*) and some species groups, were well supported by molecular analysis (Ståhls and Nyblom 2000).

All known species undergo larval development in specific plants or fungi, although some species feed on a wide range of plants. There is only one known exception, the species of the subgenus *Neocheilosia* Barkalov, 1983, which feed on sap and cambium of coniferous trees. One of the most serious pests of genus *Cheilosia*, is the species *C. vulpina* (Meigen, 1822) that infested 50% of artichoke (*Cynara scolymus*) crops in Northern France during the 1980s (Rotheray and Gilbert 2011). Although larvae of species from the *proxima* group are mostly undescribed, except *C. proxima* (Zetterstedt,

1843) and *C. vulpina*, they were observed from different plants by several authors. Very often these larvae mine stems, roots or rhizomes, or, rarely, graze roots externally, as observed in larva of *C. proxima* found on *Cirsium palustre* (Rotheray and Gilbert 2011). *C. gigantea* (Zetterstedt, 1838) was reported from *Rumex* sp.; *C. pascuorum* Becker, 1894 is an internal feeder in *Cynoglossum officinale*; *C. proxima* (Zetterstedt, 1843) was collected from *Cirsium palustre* and *C. oleraceum*; *C. rufimana* (Becker, 1894) was observed ovipositing on *Polygonum bistorta*, while *C. velutina* Loew, 1840 mines the stems of *Cirsium palustre* and the rhizome of *Scrophularia nodosa* (Speight 2012). While phytophagous hoverflies can cause economic damage by attacking cultivated plants, they can also be used beneficially to control weeds. Examples of this are *C. psilophthalma* (Becker, 1894) and *C. urbana* (Meigen, 1822), which have been found to be efficient biological control agents for *Hieracium* spp., and which are sufficiently host-specific for release in New Zealand where no native *Hieracium* species exist (Grosskopf et al. 2002).

These blackish hoverflies without mimetic features still cause identification troubles for taxonomists, due to the existence of many morphologically similar taxa with variable characters. There is no key through which all European species of *Cheilosia* can be identified. Recently, attempts have been made to stabilise the nomenclature of western European *Cheilosia* species, by dealing with small groups of closely related species (Barkalov and Ståhls 1997, Claussen 1998, Claussen and Speight 2007, Haarto and Kerppola 2007, Speight 2012). In the last decade, only a few species were described from Europe, including *C. ingerae* Nielsen & Claussen, 2001 (Nielsen and Claussen 2001), *C. naruska* Haarto & Kerppola, 2007 (Haarto et al. 2007) and *C. thessala* Claussen & Ståhls, 2007 (Claussen and Ståhls 2007).

Vujić (1996), in his revision of the *Cheilosia* species from the Balkan Peninsula, recorded 77 species and two subspecies: nearly half of the 175 registered European species (Speight 2012). The influence of different biogeographical regions over different geological periods resulted in great biodiversity on the Balkan Peninsula, making it one of the important speciation centres in Europe (Vujić 1996, 1997, 1999a, 1999b, Vujić et al. 1994, 2008). Many species of the genus *Cheilosia* have been described from this area, e.g. *Cheilosia alba* Vujić & Claussen, 2000 (Vujić and Claussen 2000), *C. balkana* Vujić, 1994 (Vujić 1994b), *C. bracus* Vujić & Claussen, 1994 (Vujić and Claussen 1994b), *C. clama* Claussen & Vujić, 1995 (Claussen and Vujić 1995), *C. griseifacies* Vujić, 1994 (Vujić 1994a), *C. katara* Claussen & Vujić, 1993 (Claussen and Vujić 1993), *C. orthotricha* Vujić & Claussen, 1994 (Vujić and Claussen 1994a), *C. redi* Vujić, 1996 (Vujić 1996), and *C. vujici* Claussen & Doczkal, 1998 (Claussen and Doczkal 1998).

After detailed analysis of published material under the name *Cheilosia pascuorum* Becker, 1894 from the Balkan Peninsula (Vujić 1996), one new morphologically cryptic species was discovered and is described in the present text. This new cryptic species belongs to the *proxima* group of *Cheilosia* s. str., together with the other Palearctic species *C. balkana*, *C. gigantea*, *C. ingerae*, *C. pascuorum*, *C. proxima*, *C. rufimana*, *C. velutina*, and *C. vulpina* (see Table 1 for distribution). Nielsen and Claussen (2001)

Table 1. List of species of *Cheilosia* belonging to the *proxima* group and their distribution.

Species name	Species distribution, from Speight (2012), with additional information for the Balkan Peninsula
<i>C. balkana</i>	Alps (Italy), Balkans (Montenegro, Serbia, Slovenia).
<i>C. barbafacies</i> sp. n.	Dinaric mountains on the Balkan Peninsula
<i>C. gigantea</i>	Fennoscandia south to the Alps; Germany eastwards through northern and central Europe together with northern Italy and the Balkans (Slovenia, Bosnia and Herzegovina, Serbia, Montenegro, FRY Macedonia, Bulgaria) into European parts of Russia, and from Ukraine to the Caucasus; in Siberia from the Urals to the Pacific coast.
<i>C. ingerae</i>	Northern Norway, Sweden and Finland.
<i>C. pascuorum</i>	Alps (France, Germany, Switzerland, Austria), Romania, parts of European Russia, the Balkans (Serbia, Montenegro).
<i>C. proxima</i>	Fennoscandia south to the Pyrenees and the mountainous regions of Spain; Britain eastwards through much of Europe, the Balkans (Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro, FRY Macedonia, Greece, Bulgaria) into Turkey and European parts of Russia; in Siberia from the Urals to Kamchatka.
<i>C. rufimana</i>	From Finland, Denmark and Belgium eastwards through mountainous regions of central Europe to the Balkans (Serbia, Bulgaria); Ukraine; Kazakstan; Asiatic Russia.
<i>C. velutina</i>	Fennoscandia south to Spain; from Ireland eastwards through much of Europe into Russia and through Siberia to the Pacific coast.
<i>C. vulpina</i>	Denmark to the Pyrenees and northern Spain; from England eastwards through central Europe to the central and southern parts of Russia as far as western Siberia.

presented an identification key and diagnostic characters for the Fennoscandian species of the *proxima* species group which is here adapted and expanded. In addition, relationships between this species group and related species are discussed.

Methods

The characters used in the key, descriptions, and drawings employ the terminology established by McAlpine (1981); the male genitalia characters are defined by Claussen (1998) and Nielsen and Claussen (2001).

The specimens under study were collected by sweep netting. To study male genitalia, specimens were relaxed and the genitalia were extracted using an insect pin with a hooked tip.

Genitalia were cleared by boiling individually in tubes of water-diluted KOH pellets for 5 min. This was followed by brief immersion in acetic acid to neutralize the KOH and immersion in ethanol to remove the acid. Samples were stored in microvials containing glycerol. Drawings were made with an FSA 25 PE drawing tube attached to a binocular microscope. Measurements were taken with an eye piece graticule or micrometer.

All the studied material, including type material, has been deposited at the Department of Biology and Ecology, Faculty of Sciences, University of Novi Sad, Serbia (FSUNS).

Systematics

Tribe Rhingiini

Genus *Cheilosia* Meigen, 1822

Type species. *Syrphus flavipes* Panzer, 1798

Subgenus *Cheilosia* Meigen, 1822

Chilosia Agassiz, 1846

Cartosyrphus Bigot, 1883

Chilomyia Shannon, 1922

Chaetochilosia Enderlin, 1936

Dasychilosia Enderlin, 1936

Proxima species group

Diagnosis. Eyes pale haired; antennal pits separated; vertex grey dusted; central prominence rounded and more protruding than lateral corner of subcranial cavity, in lateral view; face at the level of central prominence less wide than half width of head. Proboscisternum of protorax not fused with adjacent sclerites; anterior anepisternum bare; scutellum with black, exceptionally yellow, marginal setae; katepisternum with upper and lower hair patches connected or narrowly divided, entirely dusted; legs predominantly black, except tibiae usually paler on both ends; front coxa without lateral tooth; last tarsomere of front leg unmodified; in females, some hairs on hind tibiae longer, at least more than half of its width. Sternites of abdomen entirely grey dusted; male genitalia: gonostylus with a characteristic dorsal lobe (Figs 1, 2), neither S-shaped (Fig. 3A) nor sickle-shaped (Fig. 4D, 4E).

Comments. This group is related and morphologically similar to the following *Cheilosia* s. str. species: *C. barbata* Loew, 1857, *C. naruska*, *C. aerea* Dufour, 1848, and *variabilis* group of species, i.e. *C. melanopa* (Zetterstedt, 1843), *C. redi*, *C. honesta* Rondani, 1868, *C. variabilis* (Panzer, 1798). Nevertheless, all of them can be distinguished by a combination of characters: *C. barbata* has a S-shaped gonostylus (Fig. 3A) and females have less dusted sternites, undusted central part of the katepisternum and a narrower frons with parallel sides; in *C. aerea*, hairs on the anterior anepisternum are present and sternites are less dusted in some specimens and populations; in *C. naruska*, sternites are undusted except for slightly dusted anterior and posterior margins; males in *variabilis* group have sickle-shaped gonostylus (Fig. 4D, 4E) and females have very short and adpressed hairs on hind tibiae.

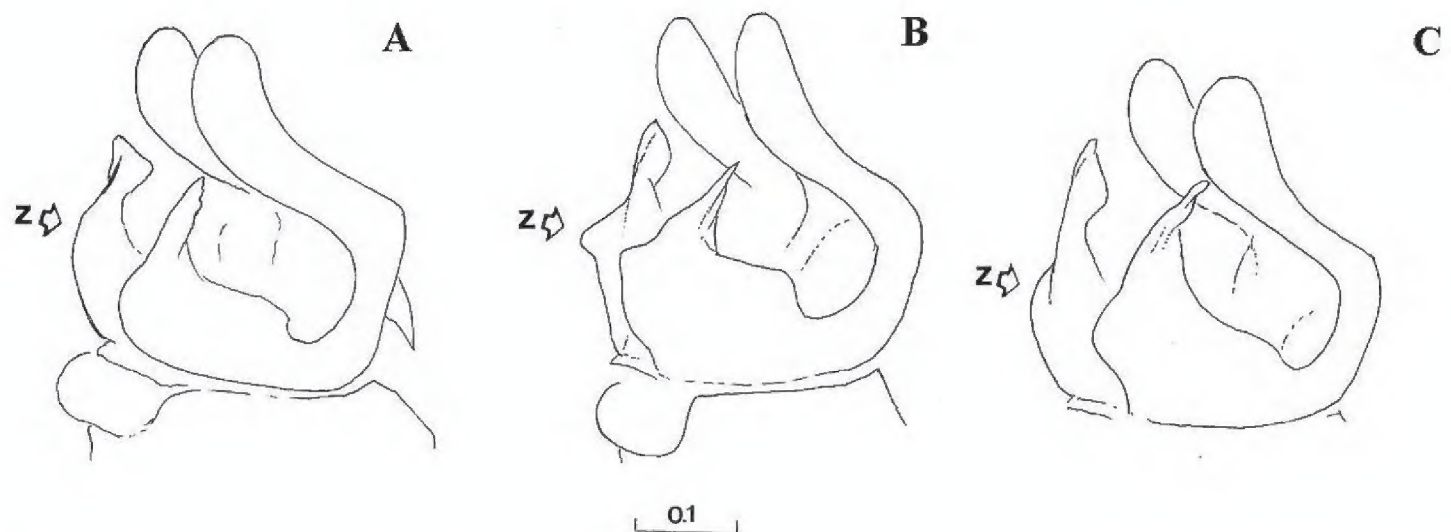


Figure 1. Gonostylus, dorsolateral view (z indicates the dorsal margin of gonostylus): **A** *Cheilosia barbafacies* sp. n., Durmitor, Montenegro **B** *C. pascuorum*, Doroslovo, Serbia **C** *C. pascuorum*, Kopaonik, Serbia. Scale in mm.

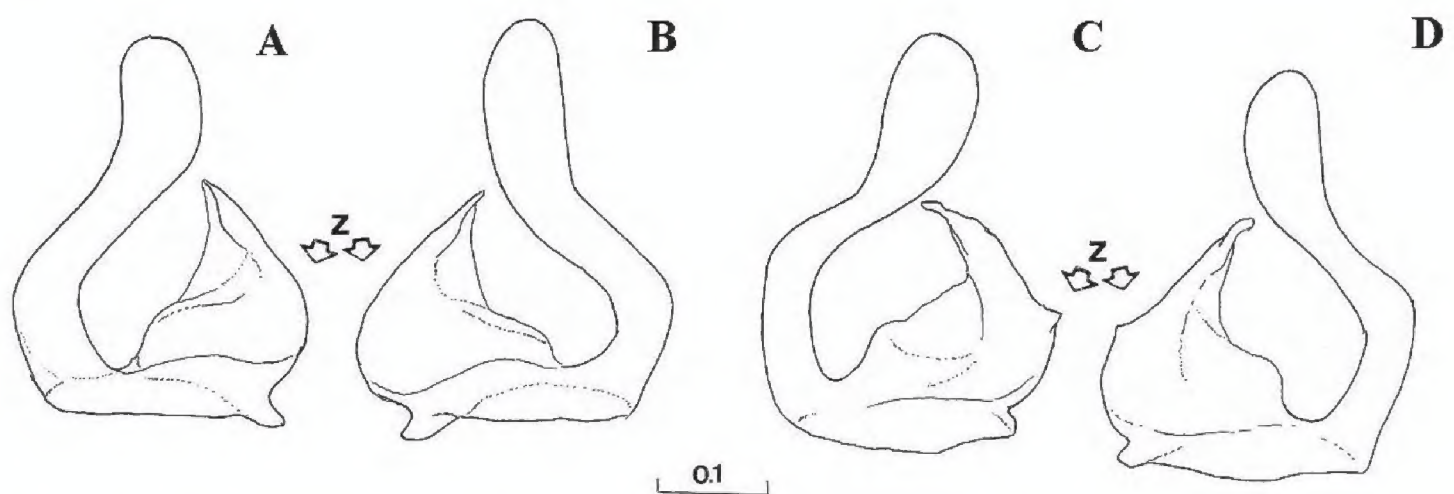


Figure 2. Gonostylus (z indicates the dorsal margin of gonostylus). **A–B** *Cheilosia barbafacies* sp. n.: **A** left gonostylus, left lateral view **B** right gonostylus, right lateral view **C–D** *C. pascuorum*: **C** left gonostylus, left lateral view **D** right gonostylus, right lateral view. Scale in mm.

***Cheilosia barbafacies* Vujić & Radenković, sp. n.**

urn:lsid:zoobank.org:act:9F2ABB52-652B-4652-AD7C-8ACB4D8579C8

http://species-id.net/wiki/Cheilosia_barbafacies

Figs 1A, 2A, 2B, 4A, 4B, 5–7, 8A, 8C, 9–11, 12A, 12B

Cheilosia honesta of Šimić, 1987 (in part).

Cheilosia pascuorum of Vujić, 1996 (in part).

Type-locality. MONTENEGRO: Durmitor, Škrčko-Sušički basen, 43°11'7"N 19°3'28"E, broad-leaf forest, 25 June 1995, A. Vujić leg.

Type-specimen: Holotype ♂, in excellent condition. MONTENEGRO. Original label: “Durmitor YU / Skakala 25.06.'95. / leg. Vujić.” 43°10'16"N; 18°59'56"E (FSUNS 05768).

Paratypes, in excellent condition. MONTENEGRO: ♂ Original label: “007. Durmitor / Skrcka jezera / 5.07.1983.” 43°8'8"N; 19°0'56"E (published in Šimić (1987) as *Chei-*

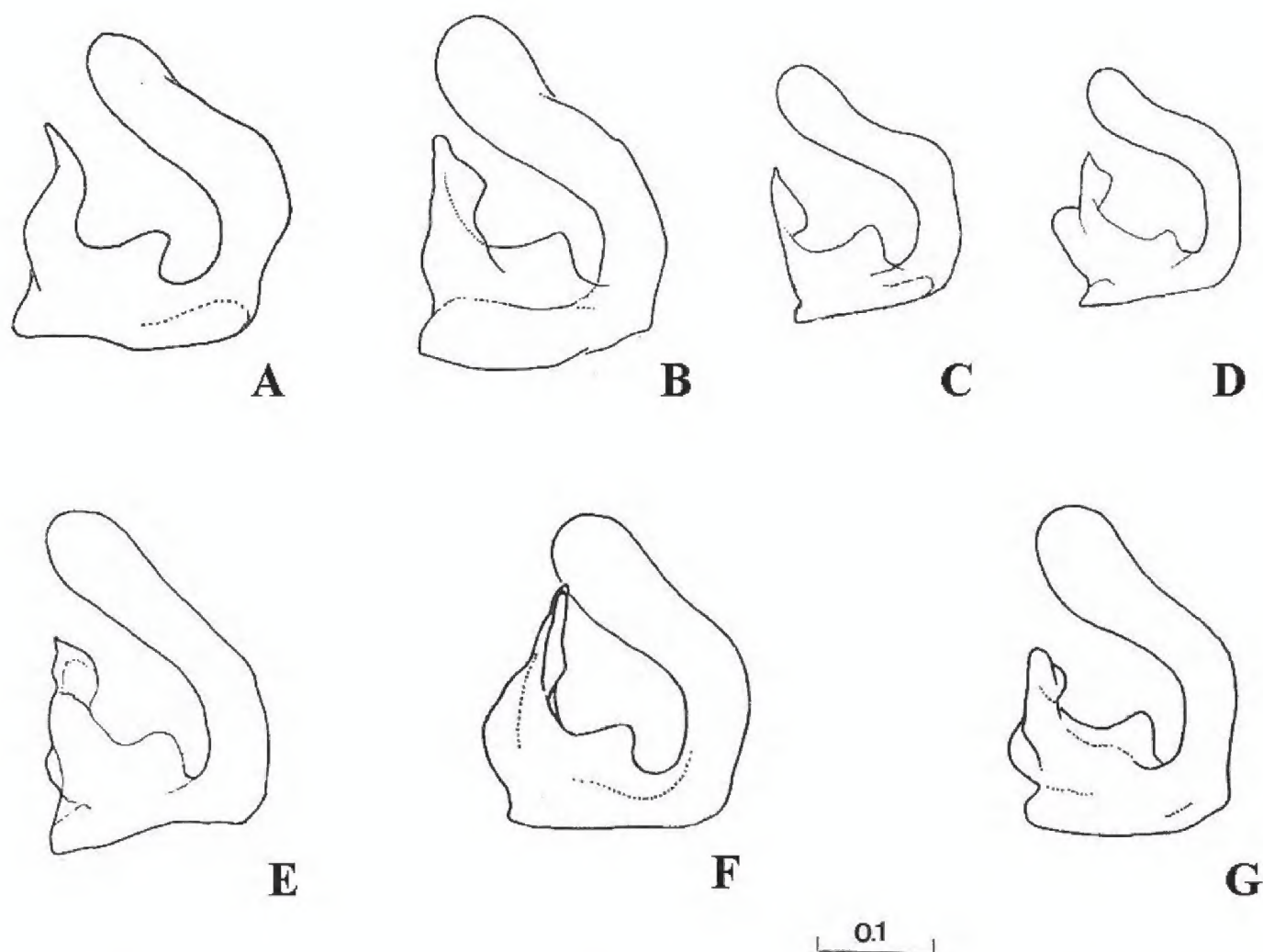


Figure 3. Right gonostylus, right lateral view: **A** *Cheilosia barbata* **B** *C. ingerae* **C** *C. balkana* **D** *C. proxima* **E** *C. gigantea* **F** *C. velutina* **G** *C. rufimana*. Scale in mm.

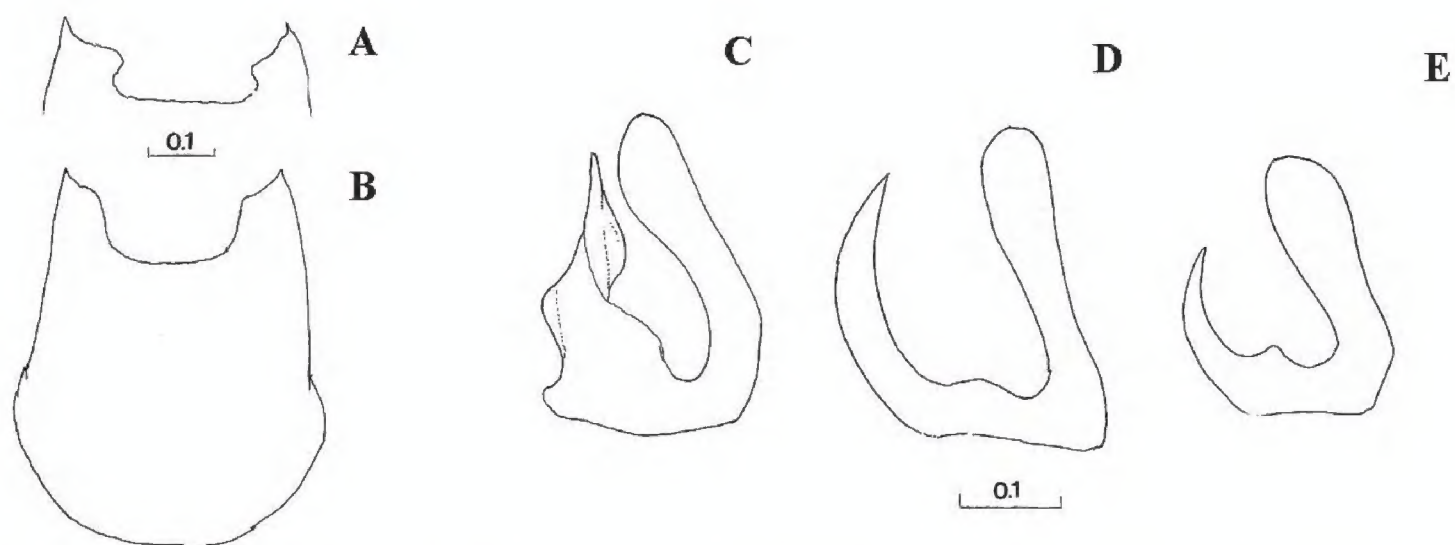


Figure 4. **A–B** *Cheilosia barbafacies* sp. n., theca of hypandrium, ventral view: **A** Montenegro, Durmitor **B** Bosnia-Herzegovina, Jahorina **C–E** right gonostylus, lateral view: **C** *C. vulpina* **D** *C. lasiopa* **E** *C. melanopa*. Scales in mm.

losia honesta) (FSUNS 05758); ♂ Original label: “199 G. Durmitor / Luke / 8.07.1991. YU.” 43°7'37"N; 19°0'5"E (published in Vujić (1996) as *Cheilosia pascuorum*) (FSUNS 05759); ♂ Original label: “199 H. Durmitor / Luke / 9.07.1991. YU.” 43°7'37"N; 19°0'5"E (FSUNS 05763); 3♂ Original label: “199 H. Kanjon Susice / 9.07.1991. YU.” 43°12'41"N; 18°59'44"E (FSUNS 05760, 05761, 05766); ♂ Original label: “Dur-

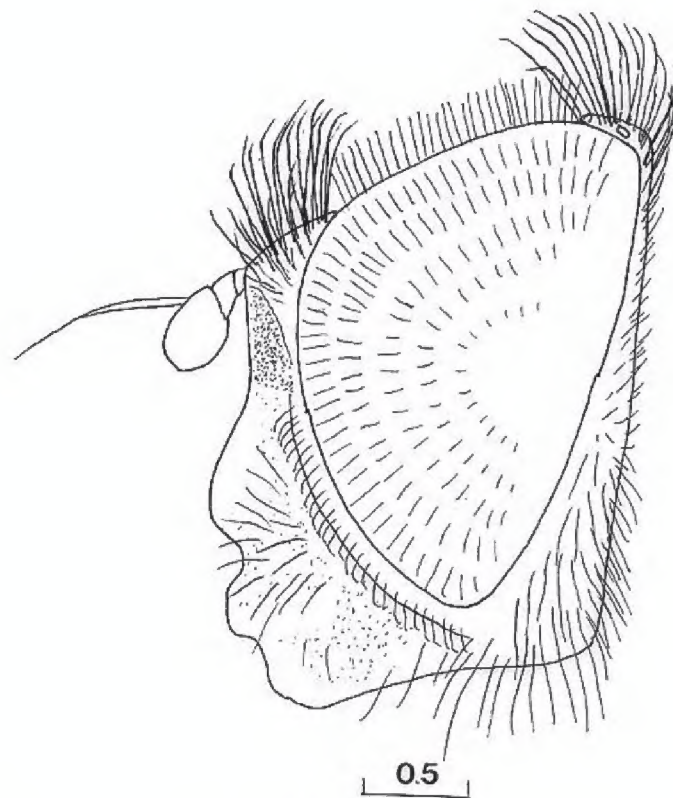


Figure 5. *Cheilosia barbafacies* sp. n., male, head, lateral view. Scale in mm.

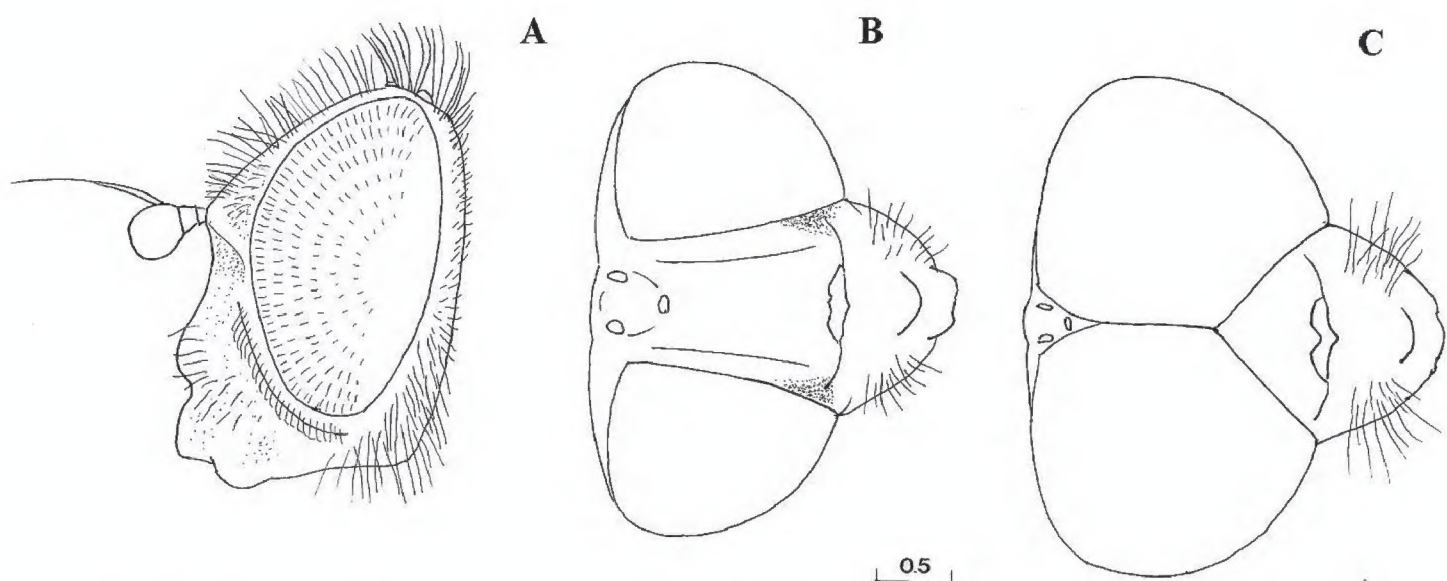


Figure 6. *Cheilosia barbafacies* sp. n., head: **A** female, lateral view **B** female, dorsal view **C** male, dorsal view. Scale in mm.

mitor 8.07.92. / Skrcko Zdrijelo YU / leg. Vujic. "43°7'7"N; 19°0'53"E (FSUNS 05765); ♂ Original label: "Durmitor 2.07.93. / ka Prutasu YU / leg. Radnovic S." 43°10'16"N; 18°59'56"E (FSUNS 05764); ♂ Original label: "Durmitor 1.6.1994 / KanjonSusice YU / leg. Vujic." 43°12'41"N; 18°59'44"E (FSUNS 05770); ♂ Original label: "Durmitor YU / Skakala 6.7.1994. / leg. Vujic." 43°11'16"N; 19°0'21"E (FSUNS 05767); ♂ Original label: "Durmitor 30.06.93. / Skrčko jezero YU / leg. Radnovic S." 43°8'8"N; 19°0'56"E (FSUNS 05762); ♂ (FSUNS 05771) ♀ (FSUNS 05769) Original label: "Durmitor 25-26.5.96. / Susica-Skrke YU / leg. Vujic". 43°11'7"N; 19°0'28"E. BOSNIA-HERZEGOVINA: ♂ Original label: "1613 Bosna / Jahorina / 14.05.1989." 43°42'25"N; 18°34'13"E (published in Vujic (1996) as *Cheilosia pascuorum*) (FSUNS 05757).

Description. MALE (Figs 1A, 2A, 2B, 4A, 4B, 5, 6C, 8A, 8C, 9A, 11A, 12A, 12B).

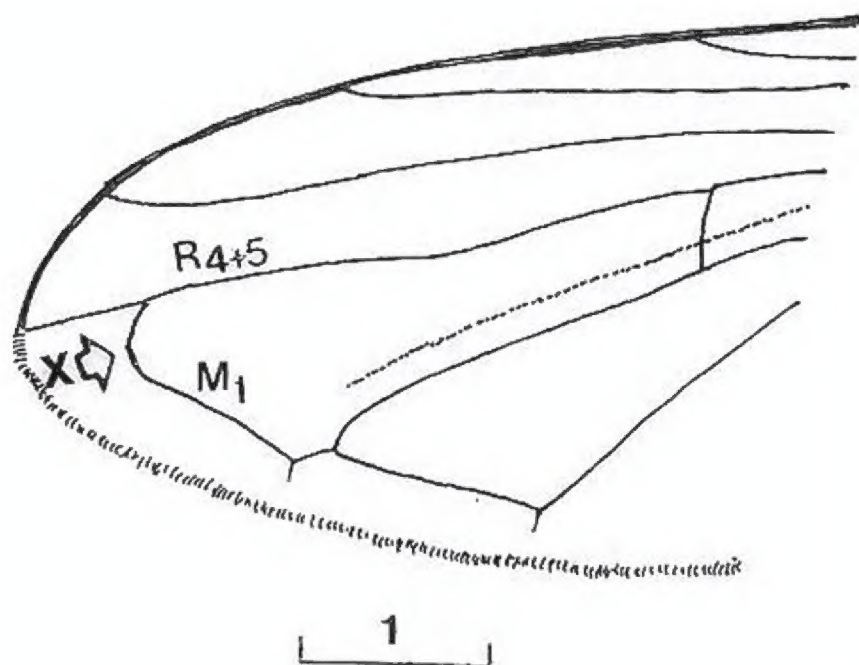


Figure 7. *Cheilosia barbafacies* sp. n., female, tip of wing (x indicates the meeting point of vein M_1 and vein R_{4+5}). Scale in mm.

Head: Face with long, predominantly pale hairs, central prominence rounded (Fig. 5); orbital stripe with short, pale hairs. Frontal triangle small, undusted, covered with black hairs; eye contiguity longer than frontal triangle (Fig. 6C). Eyes completely covered with greyish hairs. Occiput narrow, white-grey dusted. Antennae dark, third antennal segment from dark-brown to reddish; arista bare and short (Fig. 11A). Clypeus dusted.

Thorax: Scutum with dark-olive shine, laterally slightly dusted, covered with long, pale and black hairs (Fig. 9A); central disc shining, with fine puncturation. Scutellum covered with long hairs and numerous longer black hairs on posterior margin (Fig. 9A). Pleurae dusted, covered with predominantly pale hairs mixed with black hairs on anepisternum and anepimeron; katepisternum continuously pilose. **Wing** brownish, with dark veins, completely covered with microtrichia; vein M_1 meeting vein R_{4+5} at an obtuse angle (Fig. 7: x). Calypters yellowish-grey. Haltere yellowish-grey with dark capitulum. **Legs** dark, except pale apex of femora, basal 1/3–1/4 and apical 1/5–1/6 of tibiae and ventral surface of tarsi on fore and middle legs; hairs on legs predominately pale mixed with black.

Abdomen: Tergites shining, except the whole tergite 2 and dull central area on tergites 2 and 3, which extends from anterior margin of tergite 2 to basal 6/7 of tergite 3, leaving the posterior margin of tergite 3 shining; tergites covered with erected, pale hairs, except few black hairs on posterior half of tergite 4 and on pregenital segments. Sternites grey dusted covered with pale hairs.

Genitalia: Dorsal lobe of gonostylus broad basally (Fig. 8A), without distinct dorso-lateral extension (Figs 1A, 2A, 2B), present in *C. pascuorum* (Figs 1B, 1C, 2C, 2D); theca of hypandrium in ventral view with large quadrilateral excavation (Figs 4A, 4B).

FEMALE (Figs 6A, 6B, 7, 9B, 10, 11B). Similar to the male, except for normal sexual dimorphism and the following characters: pile is general shorter and more extensively pale, and legs less dark, basal 1/4 of femora, basal 1/3 and apical 1/4 of tibiae pale; frons with two lateral channels, shiny, except dusted antero-lateral corners (Fig.

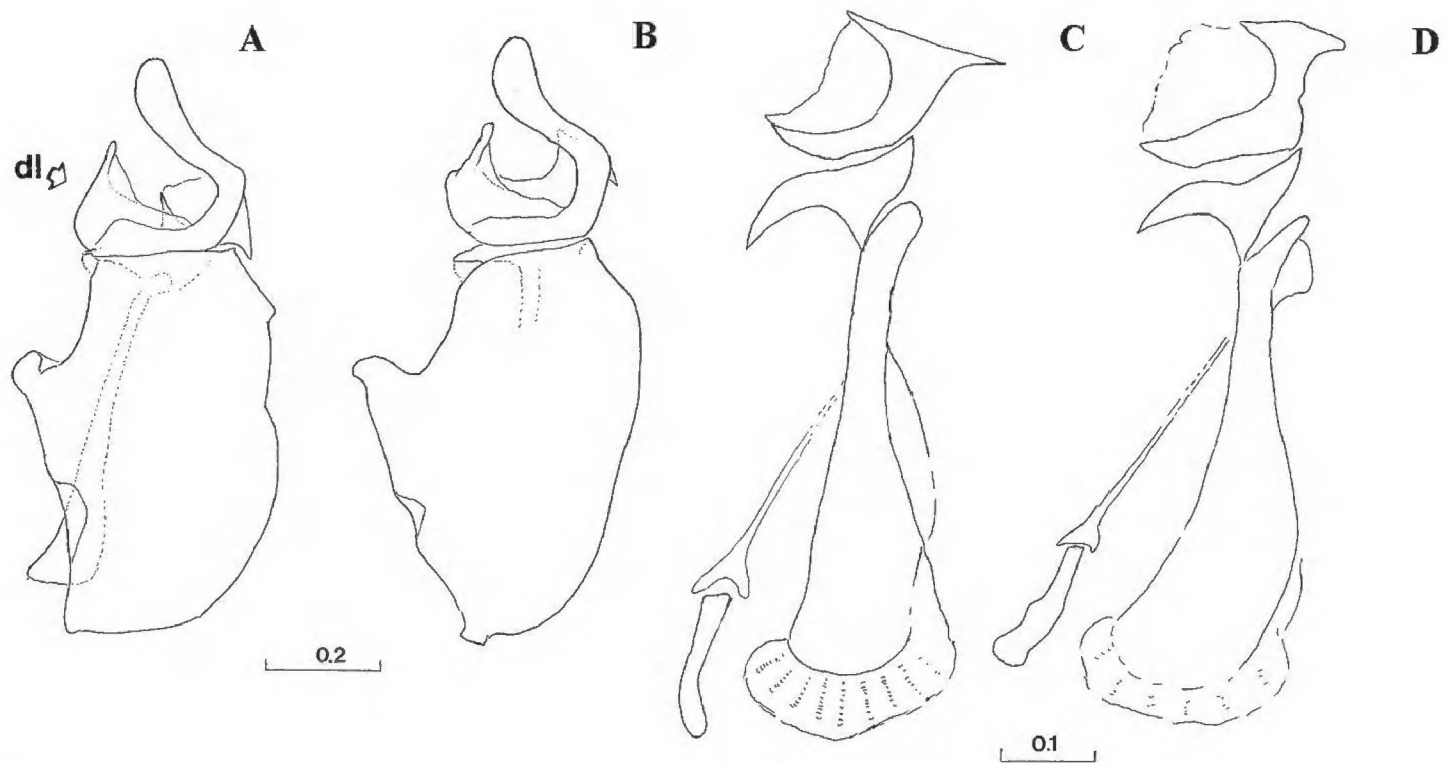


Figure 8. **A–B** Male genitalia, hypandrium, right lateral view (dl indicates the dorsal lobe of gonostylus): **A** *Cheilosia barbafacies* sp. n. **B** *C. pascuorum*. **C–D** Male genitalia, aedeagus and associated structures, right lateral view: **C** *C. barbafacies* sp. n. **D** *C. pascuorum*. Scales in mm.

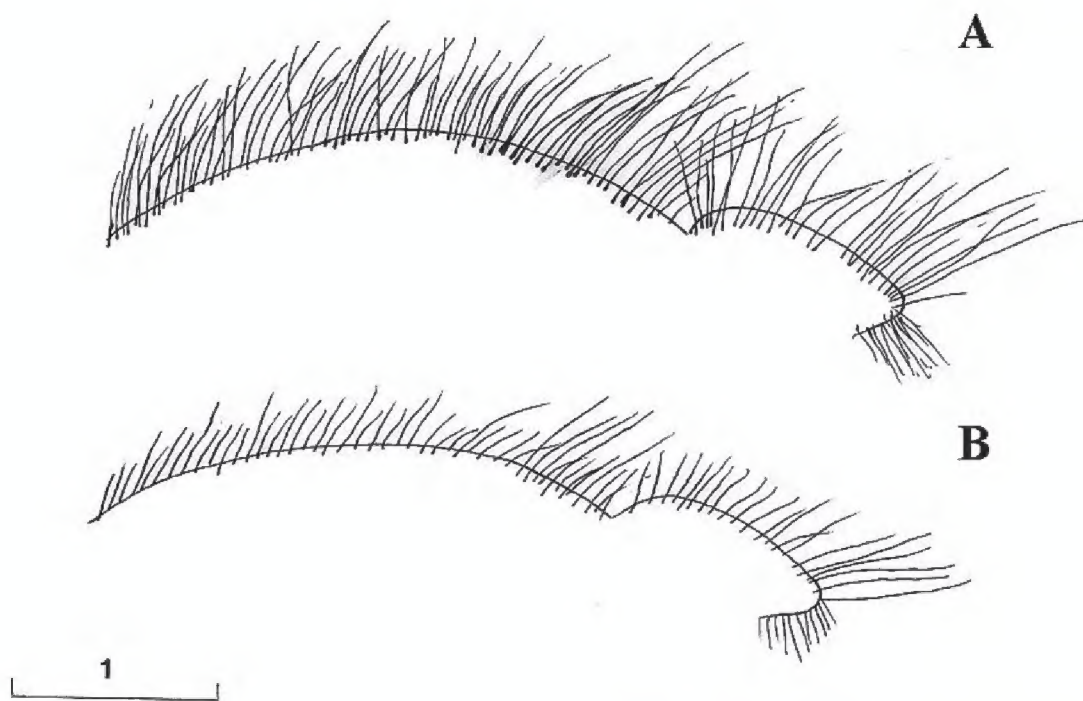


Figure 9. *Cheilosia barbafacies* sp. n., mesonotum, lateral view: **A** male **B** female. Scale in mm.

6B), covered with pale hairs, except a few black hairs around ocellar triangle and above antennae; thorax pale haired, except for a few black hairs on post-alar calli and near wing base; tibiae of fore and middle legs pale, except dark central ring; basal tarsi of fore and middle legs pale; tergites covered with long and erect hairs, except adpressed hairs on central part of tergites 1–4.

Size. Male, body length: 8.9–11.1 mm; wing length: 7.9–9.2 mm (14 specimens were measured). Female, body length: 10.5 mm; wing length: 8.7 mm (1 specimen was measured).

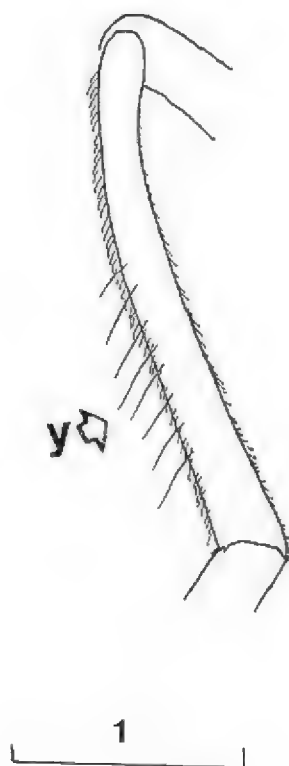


Figure 10. *Cheilosia barbafacies* sp. n., hind tibia, posterodorsal view (y indicates the hairs on posterodorsal surface). Scale in mm.

Diagnosis. Species related to *Cheilosia pascuorum*, but differs in the following characteristics: face covered with long hairs (Figs 5, 6), bare in *C. pascuorum*; clypeus dusted, shining in *C. pascuorum*; male genitalia: dorsal lobe of gonostylus without distinct dorsolateral extension (Figs 1A, 2A, 2B), present in *C. pascuorum* (Figs 1B, 1C, 2C, 2D).

Based on the identification keys for European hoverflies, this species can be confused with four other *Cheilosia* species which have long facial hairs: *C. barbata* (Fig. 3A), *C. lasiopa* Kowarz, 1885 (Fig. 4D), *C. melanopa* (Fig. 4E) and *C. vulpina* (Fig. 4C). Identification of the new described species is possible based on a combination of the following characters: arista bare; central disc of scutum shining; vein M1 meeting vein R_{4+5} at an obtuse angle (Fig. 7: x); tergites 1-3 pale haired; sternites obviously grey dusted; male: dorsal lobe of gonostylus broader basally (Fig. 8A); female: arista about 3 times as long as third antennal segment (Fig. 11B); hairs on scutum long and erected (Fig. 9B); hind tibia on posterodorsal surface with few longer hairs (Fig. 10: y).

Etymology. The specific epithet is derived from the Latin nouns (in apposition) of feminine gender in the nominative case: “barba” (beard) and “facies” (face). The name indicates the presence of long hairs on the face.

Distribution (Fig. 13). *Cheilosia barbafacies* sp. n. is found in two Dinaric mountains in the central part of the Balkan Peninsula, in Durmitor (Montenegro) and Jahorina (Bosnia-Herzegovina), while the related species, *C. pascuorum*, has a wider range extending from the Alps, across the Balkan Peninsula, to Romania and the European part of Russia (Speight 2012). Both species appear sympatrically within one refuge area rich in endemics and relict species (Durmitor mountain, gorge of river Sušica and glacial lakes Škrčka jezera) (Šimić 1987, Vujić 1996).

Discussion. Although *C. barbafacies* has long facial hairs, it is closely related to *C. pascuorum* with a non-hairy face. Species with long facial hairs were assigned to “group

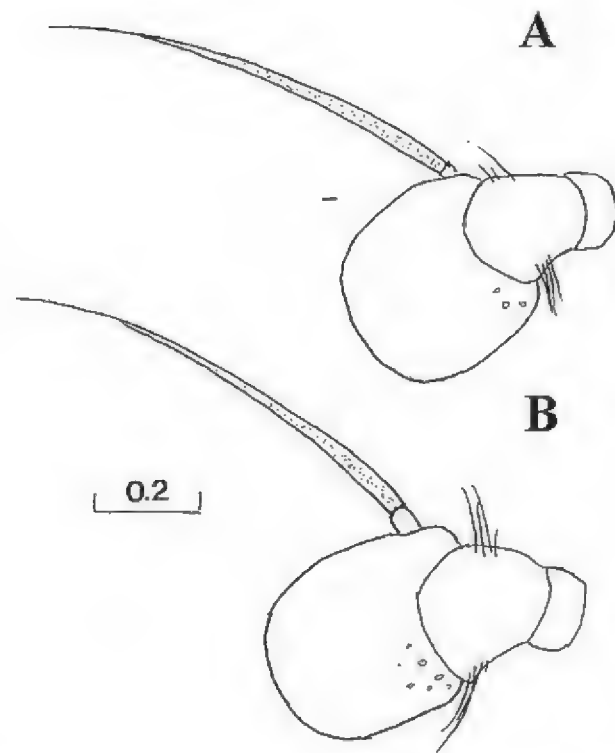


Figure 11. *Cheilosia barbafacies* sp. n., antennae, lateral view: **A** male **B** female. Scale in mm.

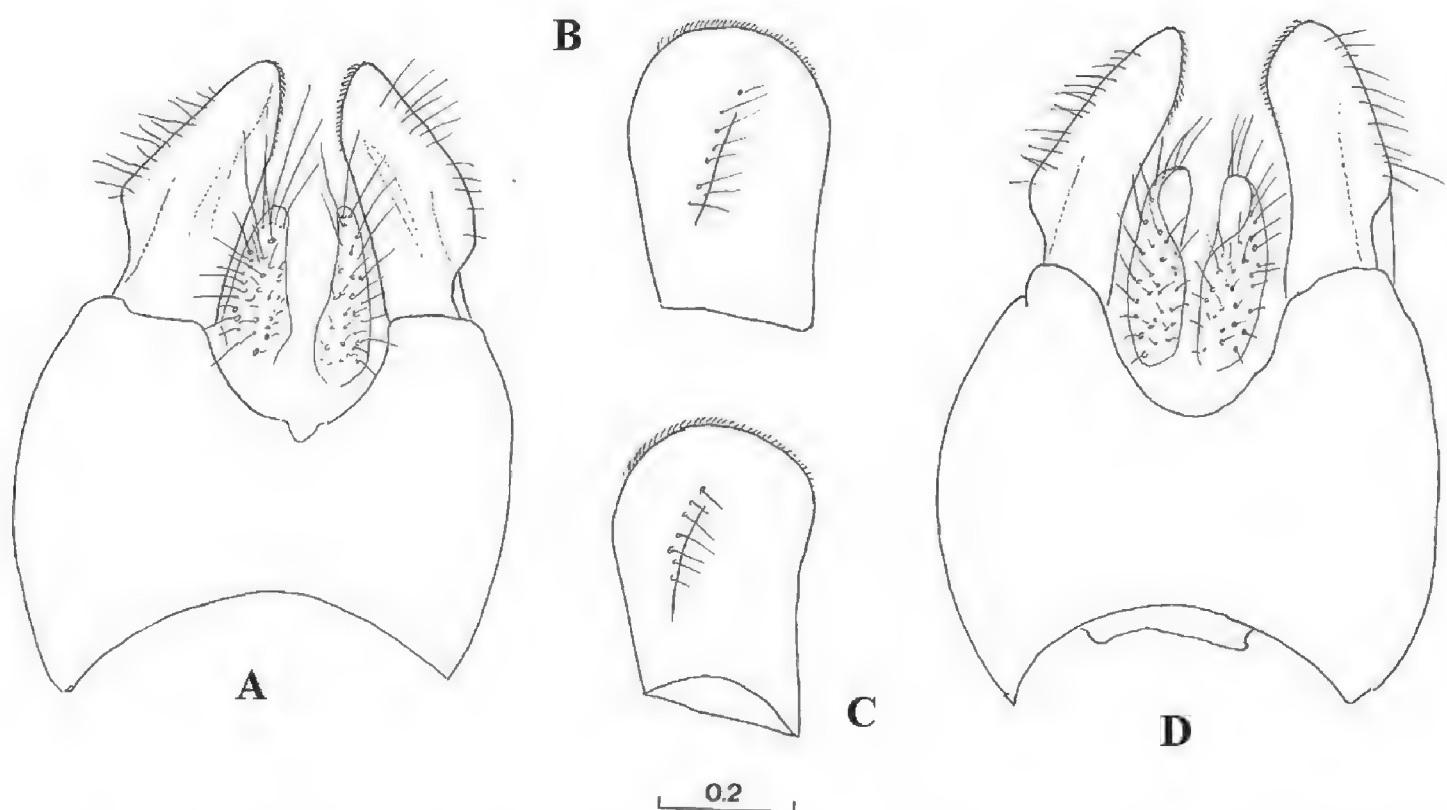


Figure 12. **A, D** Male genitalia, epandrium, dorsal view: **A** *Cheilosia barbafacies* sp. n. **D** *C. pascuorum* **B, C** Surstylus, right lateral view **B** *Cheilosia barbafacies* sp. n. **C** *C. pascuorum*. Scale in mm.

B” of Sack (1928-1932), based on Becker’s (1894) revision of the genus. Also recent authors (e.g. Bartsch et al. 2009) still use this old name (“group B”) in their keys for practical reasons. In his recent classification of the genus, Barkalov (2002) included taxa with long facial hairs in seven out of his thirteen subgenera, i.e. subgenera *Cheiloisa* s. str., *Convocheila* Barkalov, 2002, *Endoiasimyia* Bigot, 1882, *Floccocheila* Barkalov, 2002, *Hiatomyia* Shannon, 1922, *Neocheilosia* Barkalov, 1983 and *Taeniochilosia* Oldenberg, 1916. Phylogenetic analysis of the relationship between the genus *Cheilosia* and the

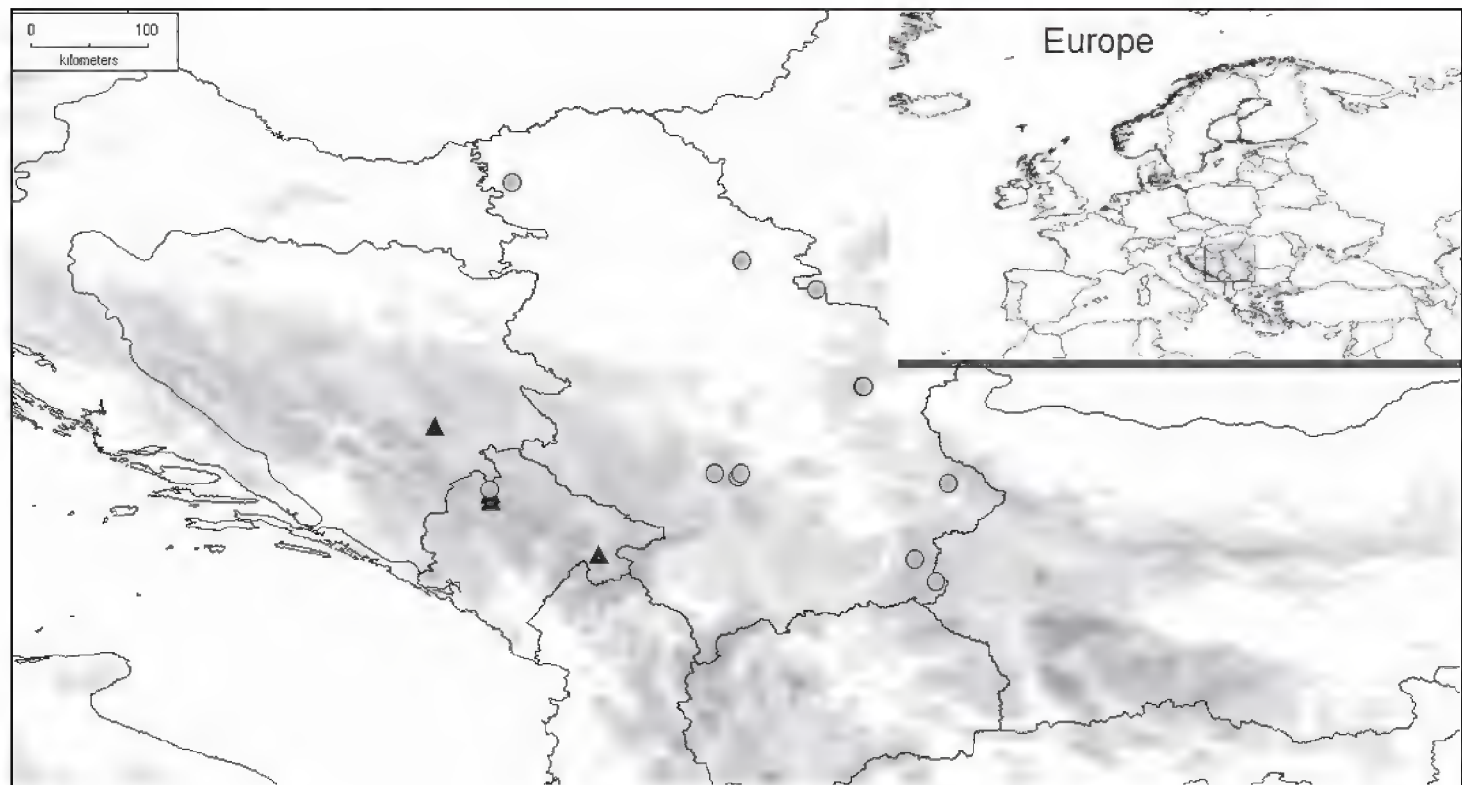


Figure 13. Distribution of *Cheilosia barbafacies* (▲) and *C. pascuorum* (●).

tribe Rhingiini, based on mtDNA COI gene sequence (Ståhls et al. 2004), revealed that *Cheilosia* species with this character state can be found in eight clades (see Fig. 1 in Ståhls et al. 2004). It seems clear that the length of the facial pilosity is not a synapomorphic character of any species group, and might evolve several times within the genus *Cheilosia*.

In Bartsch et al. (2009), specimens of *C. barbafacies* key out to *C. vulpina* (group B), and in Van Veen (2004), males and females with dark-brown antennae can be identified as *C. vulpina*, while specimens with reddish antennae are *C. barbata*. For the separation of *C. barbafacies* from *C. barbata*, diagnostic characters of the *proxima* group can be used, and the distinction between *C. vulpina* and *C. barbafacies* sp. n. is presented in the following key.

Some females of *C. barbafacies* sp. n. are similar to females of *C. redi*, and they can be separated by the following characters:

C. barbafacies sp. n.: vein M1 meeting vein R_{4+5} with an obtuse angle (Fig. 7: x); hairs on scutum and tergites long and erected (Fig. 9B); hind tibia on posterodorsal surface with few longer hairs (Fig. 10: y).

C. redi: vein M1 meeting vein R_{4+5} with an acute angle; hairs on scutum and tergites shorter and significantly adpressed; hind tibia on posterodorsal surface without long hairs.

Identification key for European species of the *Cheilosia proxima* group

- | | | |
|---|--|---|
| 1 | Face with long hairs | 2 |
| — | Face bare..... | 3 |
| 2 | Tergites pale haired (at least 1-3 in males); arista nearly bare. Male: central disc of scutum shining; dorsal lobe of gonostylus broad basally (Fig. 8A). | |

- Female: vein M1 meeting vein R_{4+5} at an obtuse angle (Fig. 7: x) *C. barbafacies* sp. n.
- At least tergite 3 in posterior half with black hairs in males, and in females tergites 2–4 with triangular area of adpressed black hairs; arista with short pubescence. Male: central disc of scutum dull; dorsal lobe of gonostylus of a different form (Fig. 4C). Female: vein M1 meeting vein R_{4+5} at right or acute angle *C. vulpina* (Meigen, 1822)
- 3 Holoptic: males 4
- Dichoptic: females 10
- 4 3rd antennal segment orange to reddish-brown, at least basoventrally clear reddish 5
- 3rd antennal segment black to blackish-brown (in some specimens paler, but not partly clear reddish) 6
- 5 Face in lateral view almost flat between central prominence and upper mouth edge; margin of upper calypter often partly with short black setulae; tergite 3 posteromedially with an area of black bristly-hairs, often also tergite 2 with such hairs near hind margin; genitalia (Fig. 3F) *C. velutina* Loew, 1840
- Face in lateral view obviously concave between central prominence and upper mouth edge; margin of upper calypter with pale setulae; tergites 2 and 3 generally with pale (reddish) hairs, but single, short, black-bristly hairs maybe present posteromedially on tergite 3; genitalia (Fig. 3G) *C. rufimana* Becker, 1894
- 6 Margin of upper calypter with short black or dark brown setulae; frons slightly swollen; gonostylus in Fig. 3B *C. ingerae* Nielsen & Claussen, 2001
- Margin of upper calypter with short pale setulae; frons not swollen 7
- 7 Abdomen (including pregenital segments) pale haired 8
- Abdomen partly black haired, at least pregenital segments with few black hairs 9
- 8 Tergite 3 shiny (sometimes dull on anterior margin); vein M1 meeting vein R_{4+5} at an acute angle; arista with short pubescence; dorsal lobe of gonostylus basally narrowed (Fig. 3C) *C. balkana* Vujić, 1994
- Tergite 3 dull centrally; vein M1 meeting vein R_{4+5} at right or obtuse angle; arista bare; dorsal lobe of gonostylus very broad basally (Fig. 8B) *C. pascuorum* (Becker, 1894)
- 9 Basal 2/3 of hind femur with the anterodorsal hair fringe longer than the anteroventral hair fringe; genitalia with the dorsal lobe of gonostylus with a more or less distinct hook on its dorsal margin (Fig. 3D) *C. proxima* (Zetterstedt, 1843)
- Basal 2/3 of hind femur with the anterodorsal hair fringe as long as or shorter than the anteroventral hair fringe; genitalia with the dorsal lobe of gonostylus simple (Fig. 3E) *C. gigantea* (Zetterstedt, 1838)
- 10 3rd antennal segment orange to reddish-brown, at least basoventrally clear reddish 11
- 3rd antennal segment black to blackish-brown (in some specimens paler, but not partly clear reddish) 12

- 11 Face in lateral view almost flat between central prominence and upper mouth edge; in dorsal view central prominence of face occupying the whole width of face; occiput behind the upper corners of the eyes shining; lunula generally dark or brownish; scutum coarsely punctured, partly wrinkled with short, inclined, pale hairs ***C. velutina* Loew, 1840**
- Face in lateral view usually concave between central prominence and upper mouth edge (but not distinctly so in all specimens); in dorsal view central prominence of the face not occupying the whole width of the face; occiput behind the upper corners of the eye often completely grey dusted; lunula generally yellowish; scutum with fine punctures, at least anterior half with erect or semi-erect, predominately pale, short hairs, not longer than diameter of hind tibiae, with some longer hairs often intermixed laterally and in front of scutellum ***C. rufimana* Becker, 1894**
- 12 Frons relatively broad (ratio between length and width 1.2-1.4, average 1.3); pleura: posterior anepisternum predominately shining, at most anterior third of the sclerite thinly dusted; barrette (upper edge of meropleuron) more or less shining, contrasting with the dusting of the adjacent sclerites; basal 2/3 of hind femora with anteroventral hair fringe as long as diameter of hind femur ***C. ingerae* Nielsen & Claussen, 2001**
- Frons relatively narrow (ratio between length and width 1.4-1.7, average 1.6); generally more than anterior third of posterior anepisternum grey dusted, often sclerite completely dusted; barrette dusted; basal 2/3 of hind femur with or without of anteroventral hair fringe **9**
- 13 Vein M1 meeting vein R_{4+5} at an obtuse angle (as in Fig 7); arista bare (as in Fig. 4B); tergites predominately pale haired... ***C. pascuorum* (Becker, 1894)**
- Vein M1 meeting vein R_{4+5} at an acute or right angle; arista pubescent; tergites partly black haired **14**
- 14 Legs black, exceptionally knees paler ***C. balkana* Vujić, 1994**
- On legs at least front and mid tibiae pale on both ends **15**
- 15 Basal 2/3 of hind femur with the anteroventral hair fringe long, often obviously longer than diameter of hind femur; apex of hind femur ventrally with some black bristles or spines ***C. gigantea* (Zetterstedt, 1838)**
- Hind femur without anteroventral hair fringe, occasionally with single longer hairs anteroventrally which are shorter than, or rarely as long as, the diameter of the hind femur; apex of the hind femur ventrally most often without black bristles or spines ***C. proxima* (Zetterstedt, 1843)**

Acknowledgements

This work was supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia (projects No. 173002 and No. 43002) and the Provincial Secretariat for Science and Technological Development of the Republic

of Serbia (Genetic resources of agroecosystems in Vojvodina and sustainable agriculture). We also thank Edward Petri and Mike Taylor for kindly improving the English language of this text.

References

- Barkalov AV (1983) The role of hypopygium in the systematics of the genus *Cheilosia* Meigen, 1822 (Diptera, Syrphidae). In: Skarlato O (Ed.) [Diptera (Insecta): Their Systematics, Geographic Distribution and Ecology]. Academica Nauka, Leningrad, 3–7. [In Russian]
- Barkalov AV (2002) Subgeneric classification of the genus *Cheilosia* Meigen, 1822 (Diptera, Syrphidae). Entomological Review 82: 518–531.
- Barkalov AV, Ståhls G (1997) Revision of the Palaearctic bare-eyed and blacklegged species of the genus *Cheilosia* Meigen (Diptera, Syrphidae). Acta Zoologica Fennica 208: 1–74.
- Bartsch H, Binkiewicz E, Klintbjer A, Rådén A, Nasibov E (2009) Blomflugor: Eristalinae & Microdontinae. Nationalnyckeln till Sveriges flora och fauna, DH 53b. Artdatabanken, SLU, Uppsala, 478 pp.
- Becker T (1894) Revision der gattung *Chilosia* Meigen. Nova Acta der Ksl. Leop.-Carol., Deutschen Akademie der Naturforscher 62(3): 194–522.
- Claussen C (1998) Die europäischen arten der *Cheilosia alpina*-gruppe (Diptera, Syrphidae). Bonner Zoologische Beiträge 47 (3/4): 381–410.
- Claussen C, Doczkal D (1998) Eine neue art der gattung *Cheilosia* Meigen, 1822 (Diptera, Syrphidae) aus der Zentralalpen. Volucella 3: 1–13.
- Claussen C, Ståhls G (2007) A new species of *Cheilosia* Meigen from Thessaly/Greece, and its phylogenetic position (Diptera, Syrphidae). Studia Dipterologica 3: 275–281.
- Claussen C, Speight MCD (2007) Names of uncertain application and some previously unpublished synonyms, in the European *Cheilosia* fauna (Diptera, Syrphidae). Volucella 8: 73–86.
- Claussen C, Vujić A (1993) *Cheilosia katara* n. sp. aus Zentralgriechenland (Diptera: Syrphidae). Entomologische Zeitschrift 103: 341–356.
- Claussen C, Vujić A (1995) Eine neue art der gattung *Cheilosia* Meigen aus Mitteleuropa (Diptera: Syrphidae). Entomologische Zeitschrift 105: 77–85.
- Grosskopf G, Smith LA, Syrett P (2002) Host range of *Cheilosia urbana* (Meigen) and *Cheilosia psilophthalma* (Becker) (Diptera: Syrphidae), candidates for the biological control of invasive alien hawkweeds (*Hieracium* spp., Asteraceae) in New Zealand. Biological Control 24: 7–19. doi: 10.1016/S1049-9644(02)00011-7
- Haarto A, Kerppola S (2007) Finnish Hoverflies and Some Species in Adjacent Countries. Otavan Kirjapaino Oy, Keuruu, 647 pp.
- Haarto A, Kerppola S, Ståhls G (2007) Description of *Cheilosia naruska* Haarto & Kerppola spec.nov. from northern Europe (Diptera, Syrphidae). Volucella 8: 63–72.
- McAlpine JF (1981) Morphology and terminology, adults. In: McAlpine JF et al. (Eds) Manual of Nearctic Diptera, vol. 1. Agriculture Canada, Ottawa, 9–63.
- Nielsen TR, Claussen C (2001) On *Cheilosia ingerae* spec. nov. (Diptera, Syrphidae) from northern Fennoscandia. Dipteron 4: 43–56.

- Peck LV (1988) Syrphidae. In: Soos A, Papp L (Eds) Catalogue of Palaearctic Diptera, 8, Akad. Kiado, Budapest, 11–230.
- Rotheray GE, Gilbert FS (2011) The Natural History of Hoverflies. Forrest Text, Cardigan, 333 pp.
- Sack P (1928-1932) Die Fliegen der Palaearktischen Region, 31. Syrphidae. Stuttgart (Schweizerbart), 451 pp.
- Speight MCD (2012) Species Accounts of European Syrphidae (Diptera). Syrph the Net. The Database of European Syrphidae. Syrph the Net publications, Dublin, 296 pp.
- Ståhls G, Nyblom K (2000) Phylogenetic analysis of the genus *Cheilosia* (Diptera, Syrphidae) Using mitochondrial COI sequence data. Molecular Phylogenetics and Evolution 15(2): 235–241. doi: 10.1006/mpev.1999.0748
- Ståhls G, Hippa H, Rotheray G, Muona J, Gilbert F (2003) Phylogeny of Syrphidae (Diptera) inferred from combined analysis of molecular and morphological characters. Systematic Entomology 28: 433–450. doi: 10.1046/j.1365-3113.2003.00225.x
- Ståhls G, Stuke JH, Vujić A, Doczkal D, Muona J (2004) Phylogenetic relationships of the genus *Cheilosia* and the tribe Rhingiini (Diptera, Syrphidae) based on morphological and molecular characters. Cladistics 20: 105–122. doi: 10.1111/j.1096-0031.2004.00023.x
- Šimić S (1987) Syrphidae (Insecta, Diptera). Biogeografska i ekološka analiza faune osolikih muva Durmitora sa osvrtom na faunu osolikih muva Crne Gore Syrphidae (Insecta, Diptera). [A biogeographical and ecological analyses of the hoverflies of Durmitor with a survey of the hoverflies of Montenegro]. In: Nonveiller G *et al.* (Eds) Fauna Durmitora, sv.2, CANU, Pos. izd.knj. 21, Odelj. prir. nauka, knj. 13, Titograd, 11–154.
- Thompson FC, Rotheray GE, Zimbado MA (2010) Syrphidae (flower flies). In: Brown BV, Borkent A, Cumming JM, Wood DM, Woodley, Norman E, Zumbado MA (Eds) Manual of Central American Diptera. NRC Research Press, Ottawa, 763–792.
- Van Veen M (2004) Hoverflies of Northwest Europe: Identification Keys to the Syrphidae. KNNV Publishing, Utrecht, 256 pp.
- Vujić A (1994a) *Cheilosia griseifacies*, eine neue fliegen-art aus Mitteleuropa (Diptera, Syrphidae). Entomofauna 15: 337–344.
- Vujić A (1994b) *Cheilosia balkana* sp. nov., new species of “*proxima*” group (Diptera, Syrphidae). Entomofauna 15: 445–456.
- Vujić A (1996) Genus *Cheilosia* Meigen and Related Genera (Diptera: Syrphidae) on the Balkan Peninsula. Mon. Dept. Nat. Sci. Matica srpska, Novi Sad, 194 pp.
- Vujić A (1997) The genus *Pipizella* (Diptera, Syrphidae) on the Balkan Peninsula and description of *Pipizella zloti* sp. n. Dipterist Digest 4: 51–60.
- Vujić A (1999a) The subgenus *Neocnemodon* GOFFE, 1944 (Diptera, Syrphidae) on the Balkan Peninsula and description of *Heringia* (*Neocnemodon*) *larusi* spec. nov. Dipteron 2 (7): 133–142.
- Vujić A (1999b) The tribe Chrysogasterini (Diptera: Syrphidae) in the Balkan Peninsula, with the description of three new cryptic species. Studia Dipterologica 6: 405–423.
- Vujić A, Claussen C (1994a) *Cheilosia orthotricha*, spec. nov., eine weitere art aus der Verwandtschaft von *Cheilosia canicularis* aus Mitteleuropa (Insecta, Diptera, Syrphidae). Spixiana 17: 261–267.

- Vujić A, Claussen C (1994b) *Cheilosia bracusi*, a new hoverfly from the mountains of Central and Southern Europe (Diptera: Syrphidae). *Bonner Zoologische Beiträge* 45: 137–146.
- Vujić A, Claussen C (2000) *Cheilosia alba* spec.nov. and first description of the female of *C. pini* Becker, 1894 (Diptera, Syrphidae). *Volucella* 5: 51–62.
- Vujić A, Radenković S, Polić D (2008) A review of the *luteitarsis* group of the genus *Pipiza* Fallén (Diptera: Syrphidae) with description of a new species from the Balkan Peninsula. *Zootaxa* 1845: 33–46.
- Vujić A, Šimić S, Radović D, Vapa Lj, Radišić P, Milankov V, Radenković S (1994) Diversity in some groups of Diptera (Arthropoda: Insecta) on The Balkan Peninsula. *Ekologija* 28, 29(1/2): 1–8.